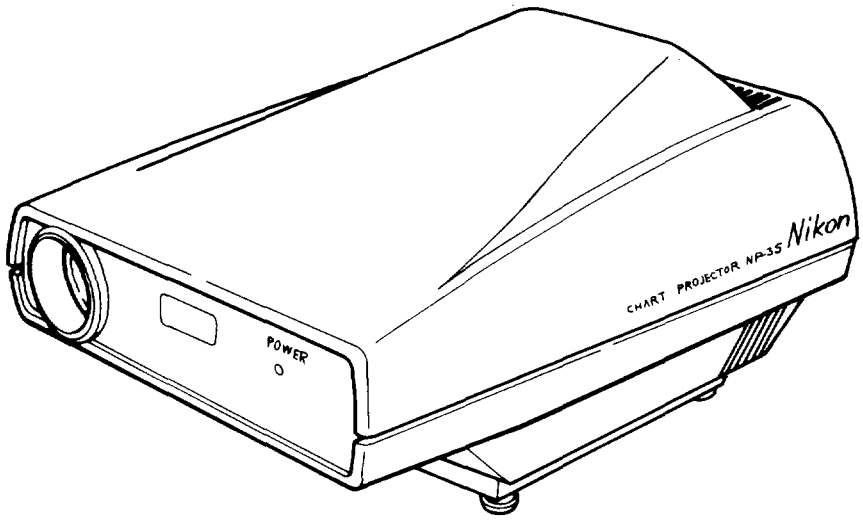
Nikon

INSTRUCTIONS

CHART PROJECTOR NP-3S



Remove the adhesive tape from the lid of the projector's shipping box. Then take out the power cord, dry batteries, and vinyl bag.

- Thank you for purchasing the Nikon Chart Projector NP-3S. Read these Instructions thoroughly in order to get the most out of this equipment. Keep these Instructions handy so that you can refer to them whenever the need arise due to an ambiguity or other difficulty.
- These Instructions are for countries other than Japan.
- Check now that you have the warranty card.

NIKON CORPORATION

CONTENTS

Read items with "▲" mark in the event of urgency.

▲ 1. Handling Cautions 1

2. Nomenclature 2

▲ 3. Setting 4
3-1. Installation 4
3-2. Cord Connection 4
3-3. How to Install the Screen (Optional Accessory ·For U.S.A. only) 4

▲ 4. How to Use 5
4-1. Power ON 5
4-2. Projection and Focusing 5

▲ 5. How to Operate the Wireless Remote Controller 6
5-1. Nomenclature of Wireless Remote Controller 6
5-2. Remote Controller Speaker Sound and Power Saving 16

6. Maintenance 17
6-1. Illumination Lamp Replacement 17
6-2. Fuse Replacement 18
6-3. Remote Controller Battery Replacement 18
6-4. Setting of Optional Chart (Optional Accessory) 19
6-5. Attachment of the Remote Controller with Wire 20
6-6. Setting for Use of Multiple Projectors 20

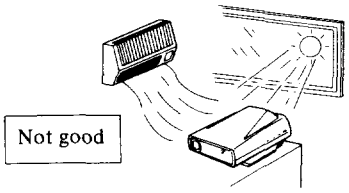
7. List of Charts 22

8. Main Specifications 28

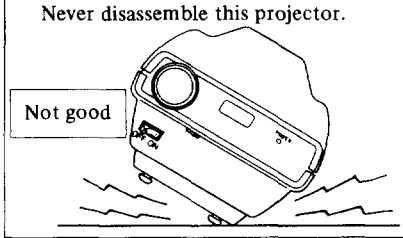
9. Standard Set and Optional Accessories 29

1. Handling Cautions

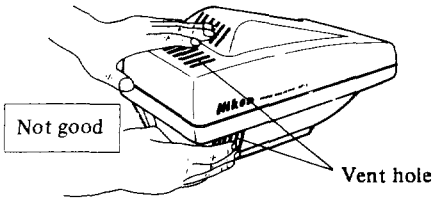
(1) Install this projector in a flat place away from dust and humidity. Avoid a place exposed to direct sunlight or to air coming directly from a heater/cooler.



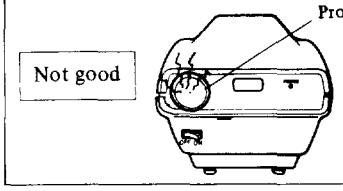
(2) This projector is a high-precision optical instrument incorporating many electrical parts. Always handle the instrument with care.
Never disassemble this projector.



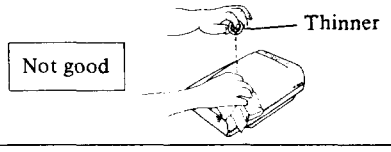
(3) Do not touch the vent hole directly or attempt to close the hole by hand or with a tool while the illumination lamp is ON, because the hole is very hot.



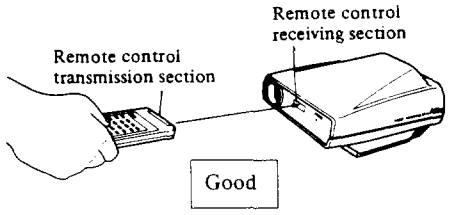
(4) Keep clean the surface of the projection lens and protect it from dust, fingerprint or damage. Dirty lens may affect image quality of the chart.



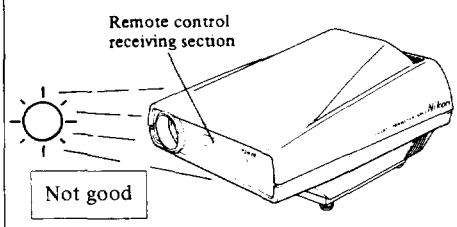
(5) Wipe any dirt off the main body and the screen (optional accessory) with a dry soft cloth such as gauze, or a cloth soaked with water. Never use other organic solvents such as thinner, acetone, alcohol or ether.



(6) Operate the remote controller while pointing it at the receiver at the front of chart projector main body.



(7) Never allow direct sunlight to enter the remote control receiving section. The sunlight may disturb normal operation, because infrared ray is used for remote control.



(8) After use, turn OFF the main switch and cover the projector with the vinyl bag.

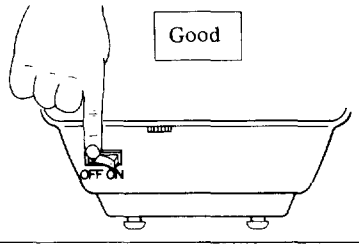


Fig. 1-1

2. Nomenclature

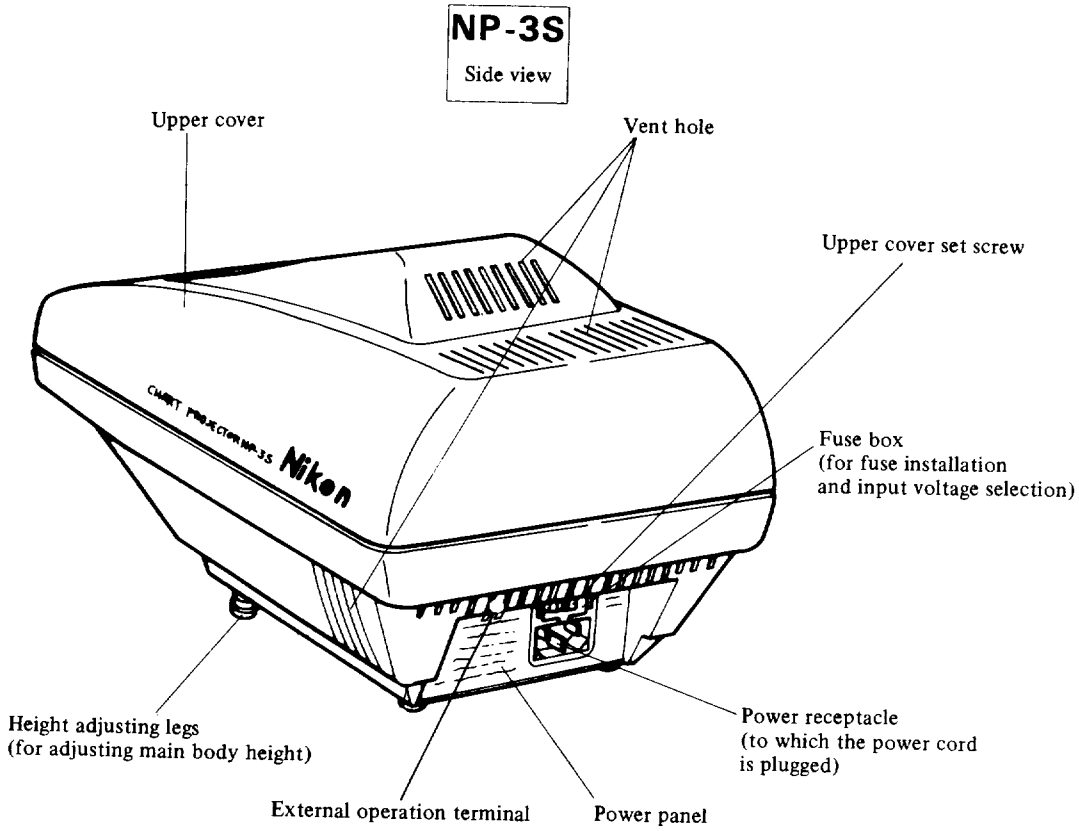


Fig. 2-1

The power switch on the power panel and the nameplates show the following symbols having the meanings indicated.

Symbol	Meaning
~	AC current
	Fuse
	OFF (Power is disconnected)
	ON (Power is connected)
	B-type equipment

NP-3S Front view

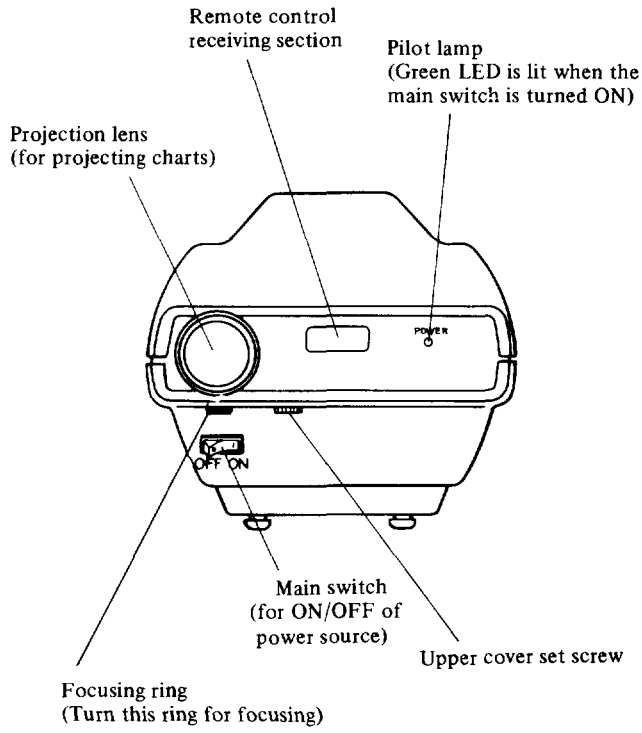


Fig. 2-2

For variable focus model
(For details, see page 5)

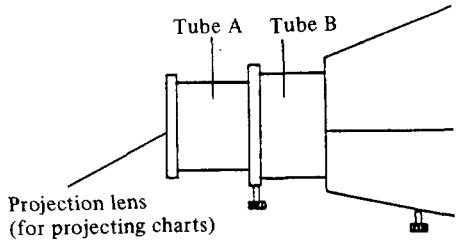


Fig. 2-3

3. Setting

3-1. Installation

First take the NP-3S out of the housing box, then perform one of the following three procedures for installation.

(1) When using the NP-3S in combination with Nikon Chair and Stand Unit, place the NP-3S on the projector table and secure it by fastening two set screws (provided) from the bottom of table into screw holes in the bottom of the main body.

(2) When using the NP-3S in combination with the wall-mounting arm, fasten two set screws from the table bottom into the screw holes in the bottom of the main body in the same way as above (1).

(3) When placing the NP-3S directly on the table without securing it by screws, turn the four rubber legs at the bottom of NP-3S to adjust the height.

3-2. Cord Connection

First plug the output connector of the power cord into the receptacle at the rear of the main body. Then plug the input connector into the power supply wall outlet.

★ Confirmation of the input supply voltage

The projector allows selection of supply voltage (100 V, 120 V, 220 V, and 240 V). Make sure that the voltage display of the instrument corresponds to the supply voltage to be used, before connecting the power cord. (The voltage selection is already preset at the factory for each destination.)

When voltage setting happens to be wrong, release the click-locks on the sides of the fuse box by pressing with a single-blade screwdriver or the like, and pull out the fuse box. Reset the inner voltage selector so that the voltage shown in the notch of the selector matches the supply voltage to be used.

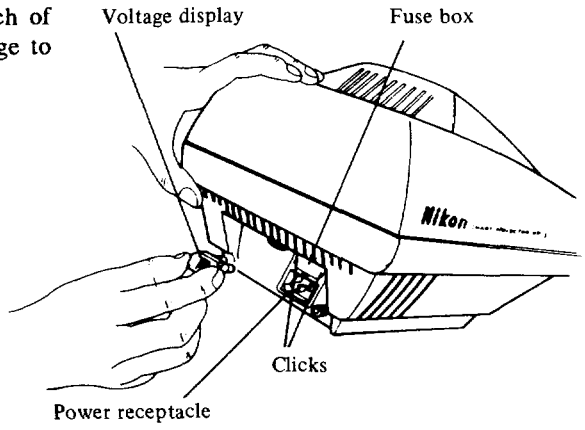


Fig. 3-1

3-3. How to Install the Screen (optional accessory for U.S.A. only)

Fix the metal supports for the screen on the wall with tapping screws, then hang the screen with string.

4. How to Use

4-1. Power ON

After connection of the power cord, turn ON the main switch as Fig. 4-1. The power pilot lamp goes ON immediately.

The chart returns to the start position (0.1 or 400 visual acuity chart) and the illumination lamp goes ON. The illumination lamp can be turned ON/OFF when the lamp key of the remote controller is pressed (see page 6 to 7)

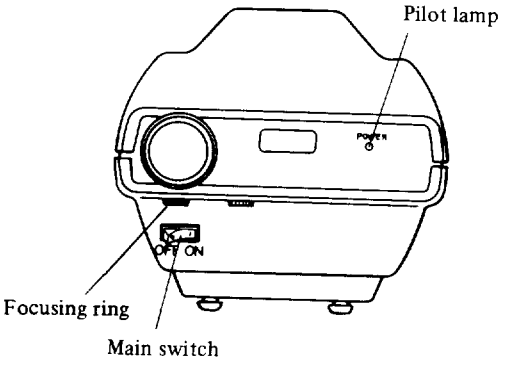


Fig. 4-1

4-2. Projection and Focusing

Set the projector so that the distance between the front projection lens and the screen will be approximately equal to the distance between the patient and the screen, as shown in Fig. 4-2. Locate the projected image at the center of the screen and focus it by turning the focusing ring. If you wish to check the size of chart at 3m, 4m, 5m, or 6m, use the test scale sheet provided in case of variable focus model, focus the chart as follows.

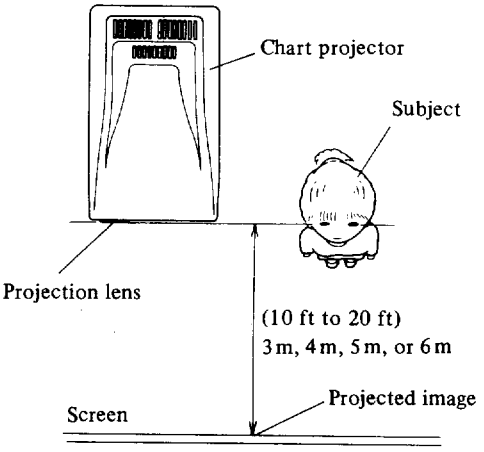


Fig. 4-2-1

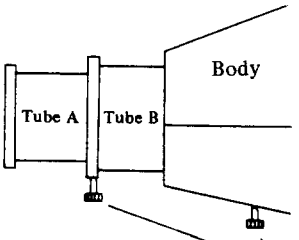


Fig. 4-2-2

For variable focus model

1) Loosen the two screws.
2) Adjust the size of the chart with the tube B.
   Focus the chart with the tube A.
   (It is better to rotate the tube to slide it back and forth.)

Testing at 10 ft to 20 ft (3m, 4m, 5m, or 6m) distance can be facilitated by using the test scale sheet provided.

Fix the test scale sheet on the screen with adhesive tape and project the 20/200 C letters chart onto it in case of the instrument for variable focus model. Then move the projector backward and forward so that the height of the projected image when focused becomes same to the height of scale bracket which corresponds to refracting distance. Refracting distance should be either 10 ft to 20 ft (3m, 4m, 5m, or 6m).

3) Tighten the screws as before.

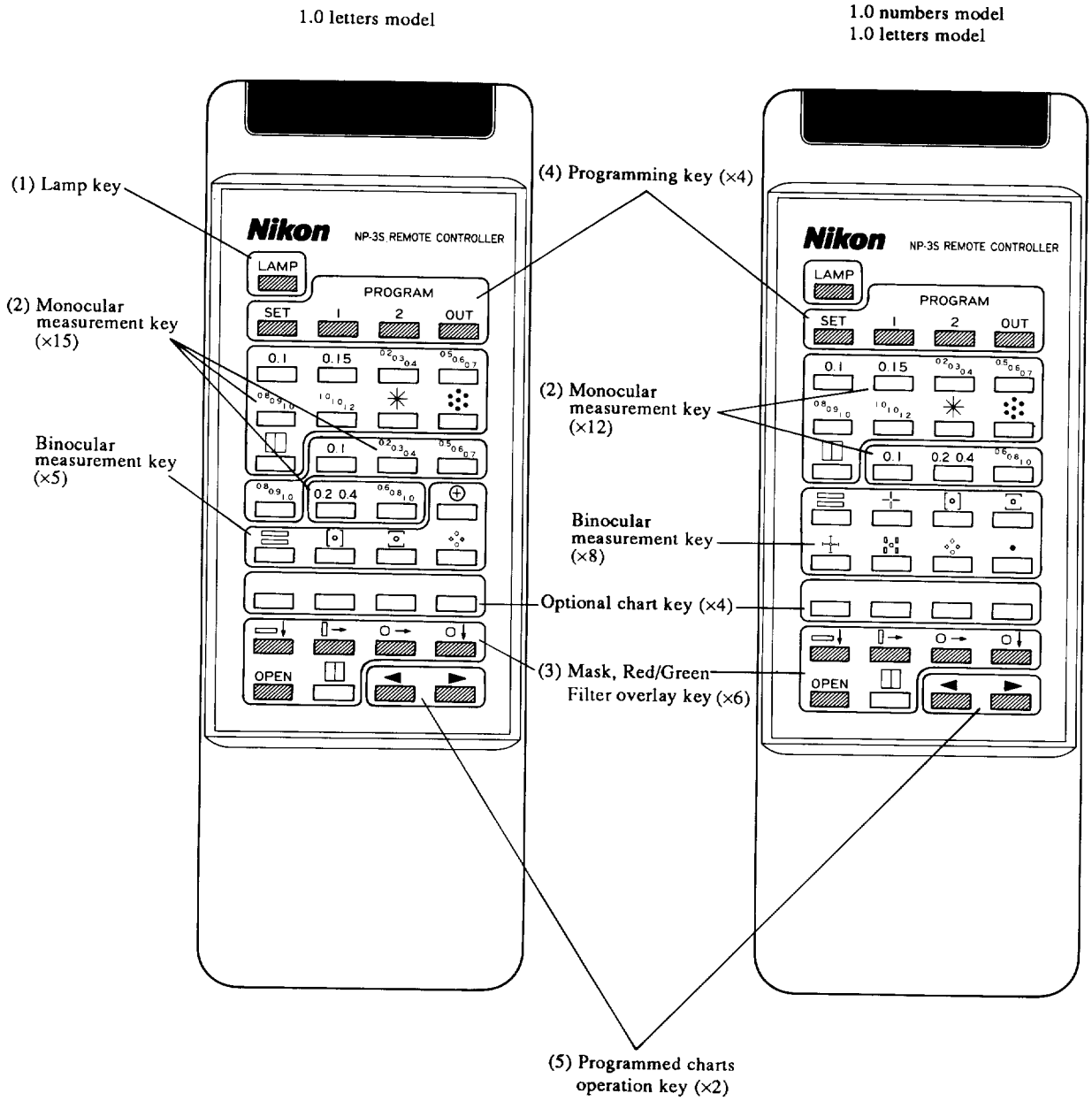
Tube A is used for focusing.

Tube B is used for magnification adjustment.

5. How to Operate the Wireless Remote Controller

5-1. Nomenclature of Wireless Remote Controller

The names of remote controller parts and operation method are described below.



20/20 letters model

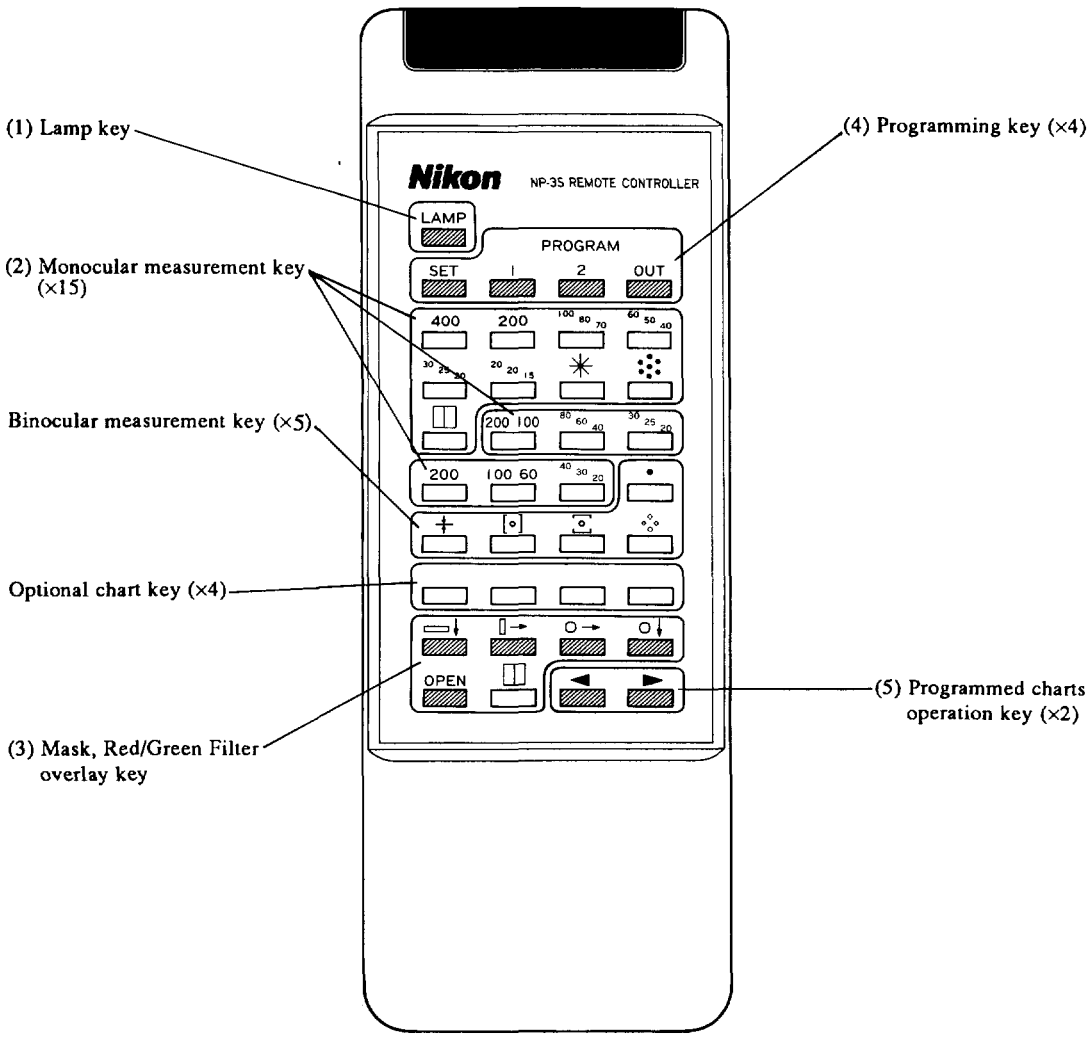


Fig. 5-1

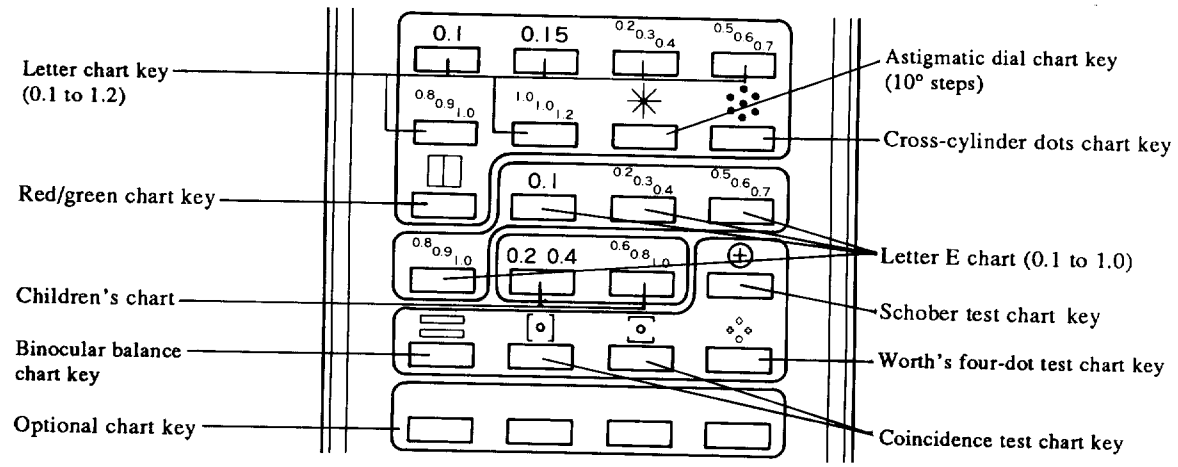
(1) Lamp key

- For turning ON/OFF the illumination lamp.

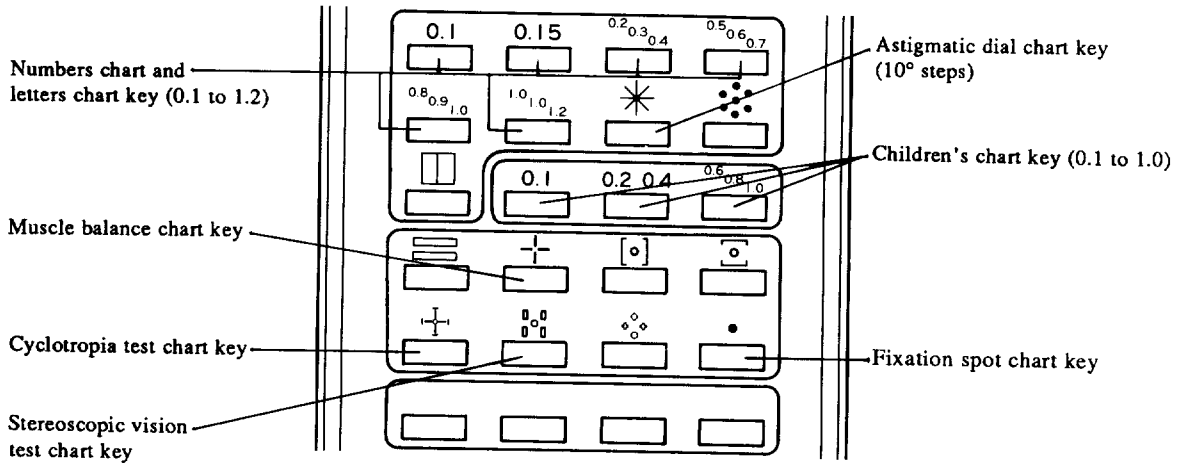
(2) Monocular measurement key
Binocular measurement key
Optional chart key

- Pressing one of these keys rotates the chart disk, and the disk stops when the selected chart comes to the optical pathway.

1.0 letters model (European multiple chart)


Letter chart key (0.1 to 1.2)
Red/green chart key
Children's chart
Binocular balance chart key
Optional chart key
Astigmatic dial chart key (10° steps)
Cross-cylinder dots chart key
Letter E chart (0.1 to 1.0)
Schober test chart key
Worth's four-dot test chart key
Coincidence test chart key

{ 1.0 numbers model (Numbers chart)
1.0 letters model (Snellen chart)


Numbers chart and letters chart key (0.1 to 1.2)
Muscle balance chart key
Cyclotropia test chart key
Stereoscopic vision test chart key
Astigmatic dial chart key (10° steps)
Children's chart key (0.1 to 1.0)
Fixation spot chart key

20/20 letters model (Snellen numbers chart)

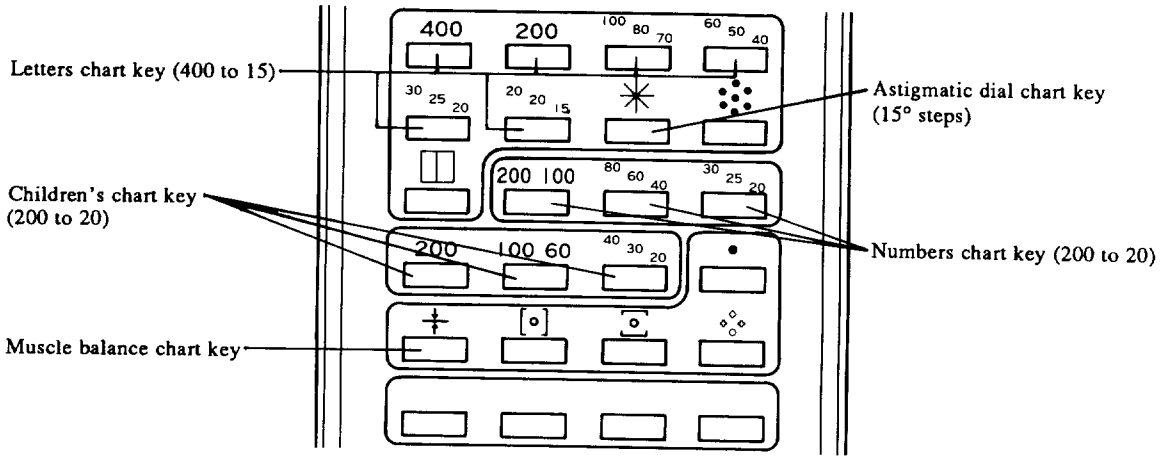
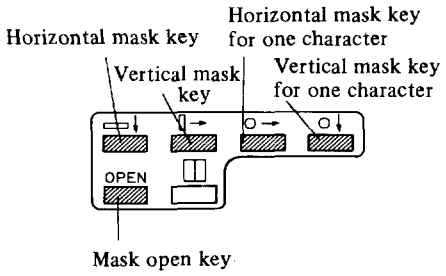

Letters chart key (400 to 15)
Children's chart key (200 to 20)
Muscle balance chart key
Astigmatic dial chart key (15° steps)
Numbers chart key (200 to 20)

Fig. 5-2

(3)-1 Mask key and R/G overlay key

The charts shown below for illustration purposes apply to European multiple chart and Snellen chart, which may be different from your projector.



• Pressing one of these keys

• Pressing one of these keys allows presentation of the desired chart portion while covering any undesired chart portion.

Table of Maskable Charts

	European multiple chart	Numbers chart Snellen chart	Snellen numbers chart
Single-letter mask	No. 4 No. 5 No. 6 No. 12 No. 13	No. 4 No. 5 No. 6	No. 4 No. 5 No. 6 No. 12
Single-row mask	Same as above, plus No. 15	No. 4 No. 5 No. 6 No. 12	No. 4 No. 5 No. 6 No. 12 No. 15
Single-column mask	No. 4 No. 5 No. 6 No. 12 No. 13	No. 4 No. 5 No. 6	No. 4 No. 5 No. 6 No. 12

• How to use mask keys

A) Each time the horizontal mask key is pressed, the horizontal long chart portion is shifted downward by 3 steps.

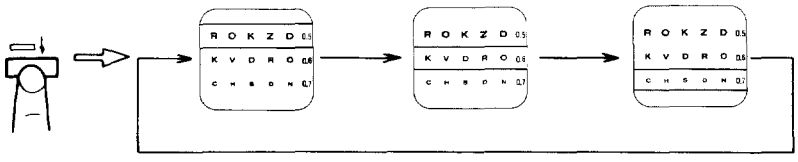


Fig. 5-3

B) Each time the vertical mask key is pressed, the vertical long chart portion is shifted to the right by 5 steps.

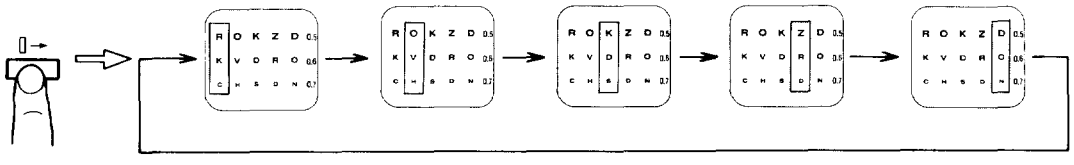


Fig. 5-4

* The mask for variable-magnification type multiple-chart is all black, unlike the above illustrations.

C) Each time the horizontal mask key for one character [(■→)] (Fig. 5-5) or the vertical mask key for one character [(■↓)] (Fig. 5-6) is pressed, the character is shifted to the right by 5 steps or downward by 3 steps.

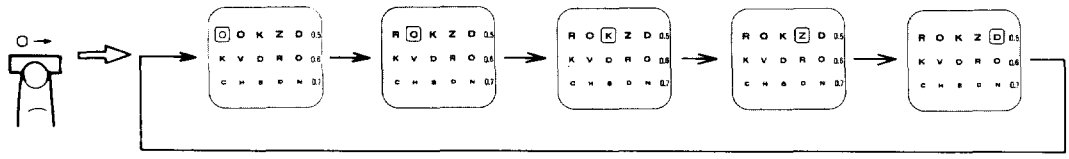


Fig. 5-5

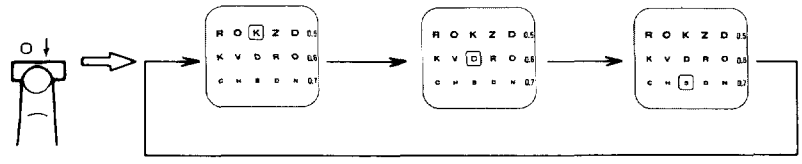


Fig. 5-6

D) When either of above keys is pressed while the chart is already masked vertically or horizontally, the character is shifted, character by character, to the right by 5 steps or downward by 3 steps.

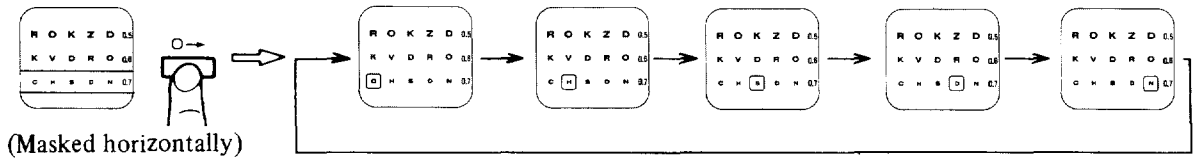


Fig. 5-7

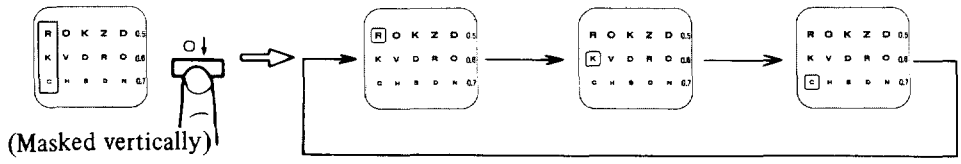


Fig. 5-8

(3)-2 Red/Green overlay key
All charts (including the four optional charts) can be overlaid with the red/green filter.

Example:

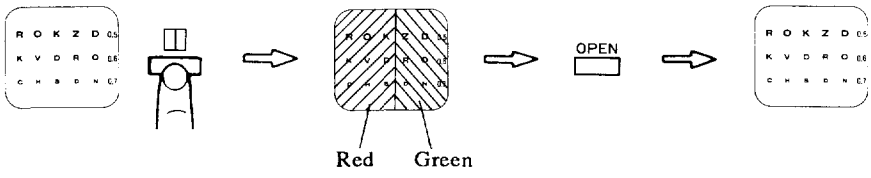
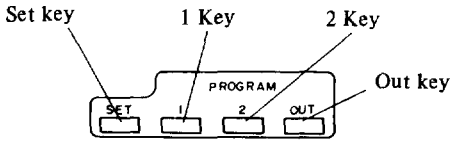


Fig. 5-9

(4) Programming key



- Use these keys to set the order of charts to be displayed. The 1 key and 2 key can set one program each. Each program can hold a record of the charts up to 16 times (max. 32 times). After setting, the program is retained, even after the main switch is turned OFF until it is reset.
- As with the mask key, the R/G overlay key is available to program overlay with the R/G filter.

●How to set the program (Perform steps 1 through 5 in order.)

1 First press the set key, then 1 (or 2) key. Melody plays.

2 Press the key for desired chart and the mask key. (If you pressed a wrong key, just press the correct key.)

3 Press the set key again. A "Beep beep" sounds to indicate that the first setting is over.

4 Repeat above steps 2 and 3 for next settings. Upon completion of the maximum 16th setting, the final "Beep beep beep" is sounded.

5 Press the out key to complete settings by 1 (or 2) key.

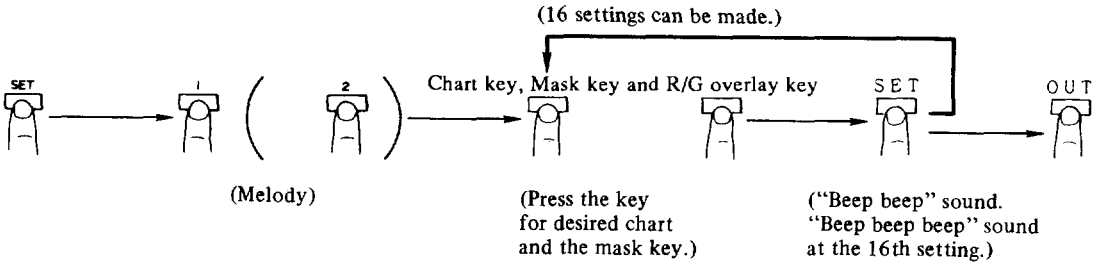


Fig. 5-10

Example of program setting

1 When charts are to be ordered in the program 1 key as shown below.

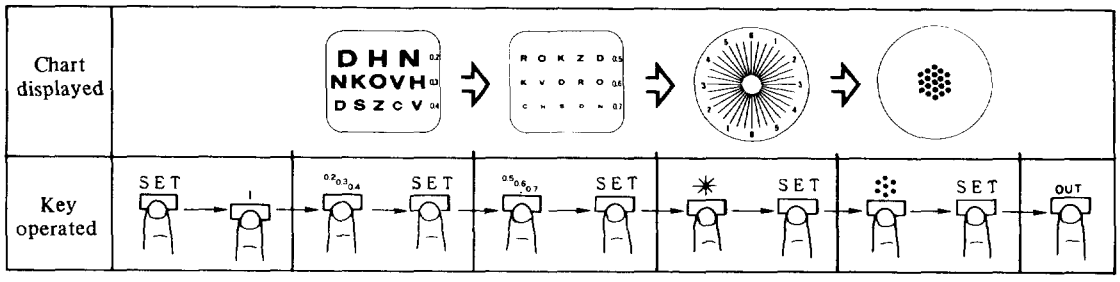


Fig. 5-11

2 When charts are to be ordered in the program 2 key as shown below.

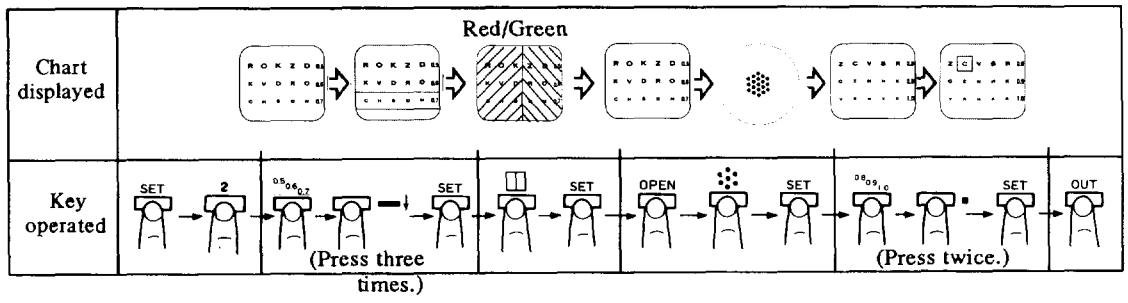
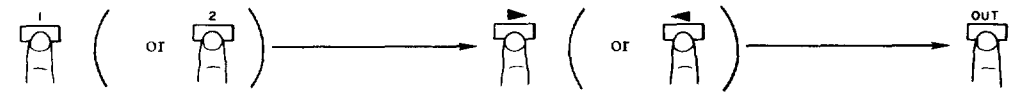


Fig. 5-12

●Program operation (Perform 1 through 4).

1 After program setting, first press the 1 (or 2) key. Melody plays, the first chart and mask (Fig. 1) already stored is displayed.

2 Press the program forward key. The next chart is displayed according to the program. At the final chart, the end signal sounds. Pressing the program backward key causes the program to be displayed in reverse order.



(First chart appears with a melody.)

(Returns to normal key operation.)

Fig. 5-13

*The chart key and mask key may be used even during program operation. To return to program operation, press either the program forward or program backward key.

3 To return to the first chart during measurement, press the 1 (or 2) key.

4 Finally, press the out key to return to normal key operation.

Example of program operation

1 When the program set in the example 1 of the previous page is to be operated

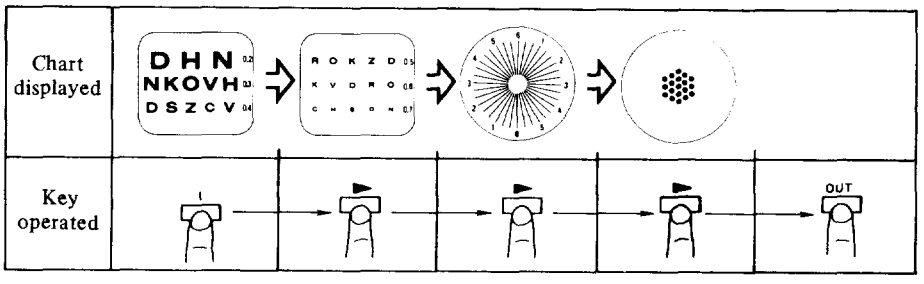


Fig. 5-14

2 When the program set in the example 2 of the previous page is to be operated (backward operation)

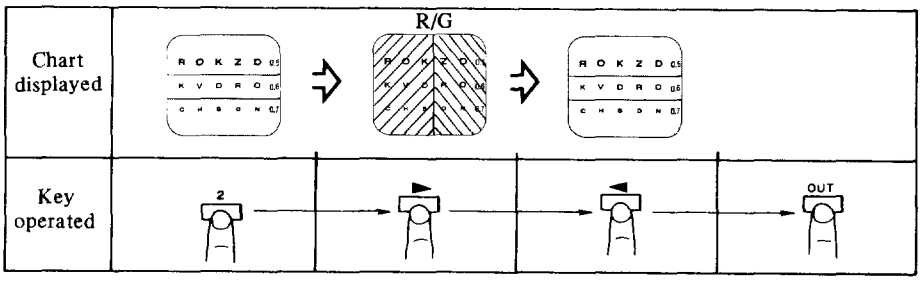


Fig. 5-15

3 When the program set in the example 2 of the previous page is to be operated (non-programmed chart display during operation)

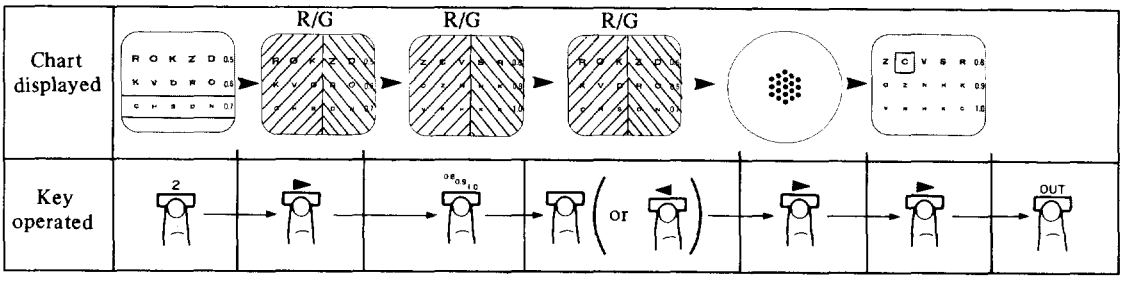


Fig. 5-16

●To clear the program, while keeping to press the set key, press the 1 (or 2) key.
The program can not be cleared during program operation, or during program setting.

Fig. 5-17

●For partial modification of the program, perform steps 1 through 4 as follows:

1 Perform steps described in 1 of "How to Set the Program". The first chart and mask already programmed is displayed.

2 Press the set key. The chart and mask is displayed according to the program.

3 When the chart and mask to be modified is displayed, take steps 2 and 3 of the "How to Set the Program"

4 Finally, press the out key to complete partial modification.

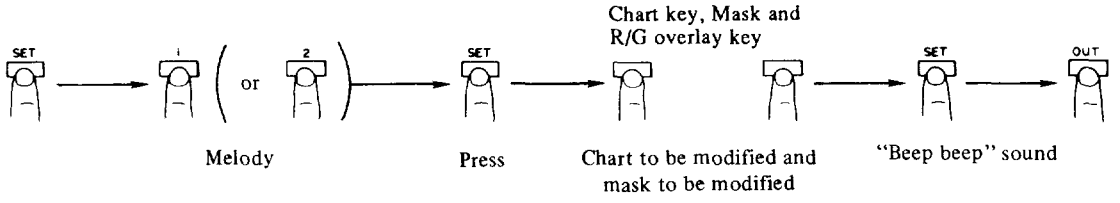


Fig. 5-18

Remarks:
If a program is already set, the following partial modification of the program is not possible.

- Deleting of a chart
- Inserting of a chart

(However, if total number of programmed charts is less than 16, it is possible to add charts next to the last chart. For example, if 12 charts are programmed, additional program of up to 4 charts (13th to 16th) is possible.)

●For whole modification of the program, perform steps 1 and 2:

1 Perform steps described in Fig. 5-17 "To clear the program ....." of page 14, so that present program should be cleared.

2 Perform steps described in "How to set the program" in page 10, to set a new program.

Example of partial program modification

1 When the third chart programmed in the former example 1 is to be modified

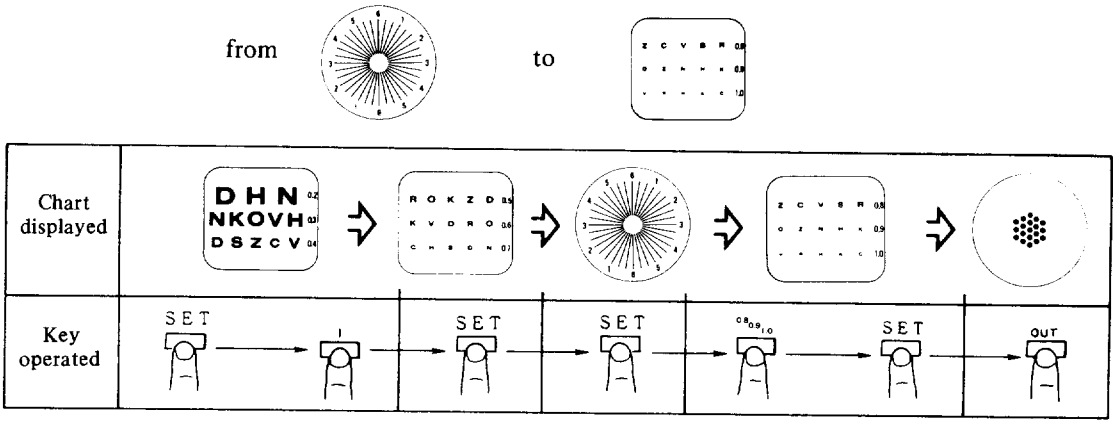


Fig. 5-19

2 When the first chart programmed in the former example 2 is to be modified

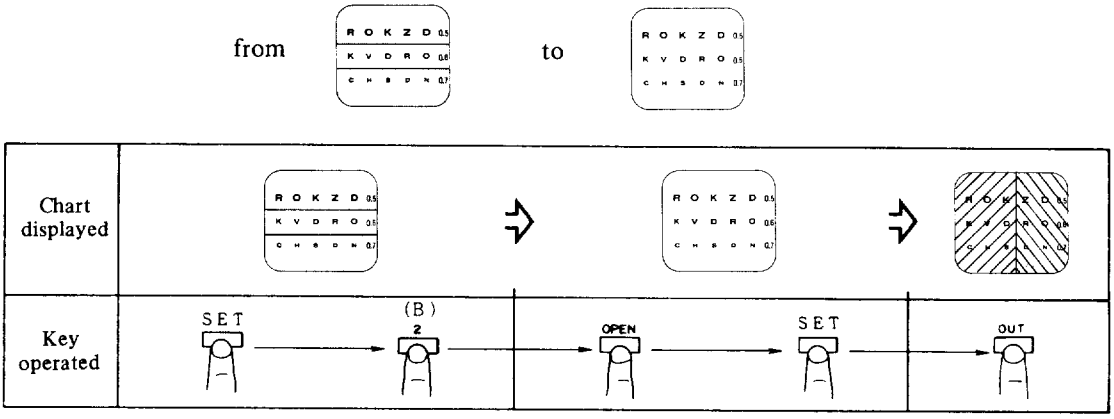
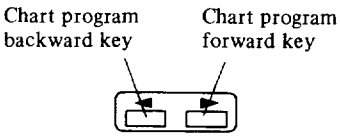


Fig. 5-20

(5) Programmed charts operation key



- These keys may be used to change the charts in a normal or reverse order.
  Pressing the forward key before operating this program displays the charts in normal order. Pressing the backward key displays the charts in reverse order.

During program operation, these keys work for displaying the charts in the order of the program.

- Before program operation (Forward charts in normal order)
- During program operation (Forward charts in programmed order)

- Before program operation (Backward charts in normal order)
- During program operation (Backward charts in programmed order)

5-2. Remote Controller Speaker Sound and Power Saving

(1) Speaker sound during operation of remote controller

When turning OFF the speaker sound of the remote controller, first turn OFF the power supply and remove the upper cover.

There are dip switches on the printed circuit board, as shown in Fig. 5-21. Set the dip switch No. 7 to "OPEN" with the tip of a ball-point pen to turn OFF the sound. (Take care not to touch other dip switches.)

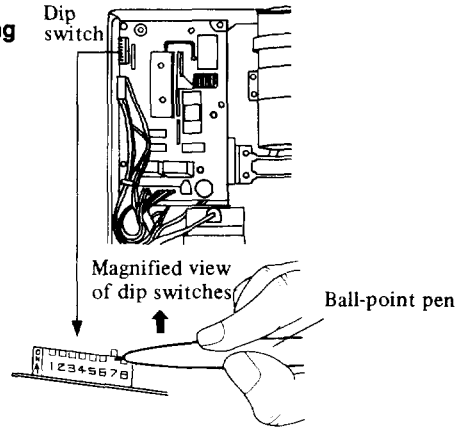


Fig. 5-21

(2) Power saving

The illumination lamp goes OFF automatically when no operation from the remote controller is made for about 10 minutes.

Turn ON the lamp key to use the instrument.

6. Maintenance

6-1. Illumination Lamp Replacement

(1) Always disconnect the power cord from the supply wall outlet before lamp replacement. Loosen the set screws at the front and rear of the body and lift the upper cover straight up with both hands to remove.
Loosen the set screw of the lamp cover (Fig. 6-1) and lift the cover straight up to remove. As shown in Fig. 6-2, cover the lamp with cloth and pull it out from the socket. Cover the new lamp (6V 20W halogen lamp) with cloth or the vinyl bag it was packed in and fit the lamp firmly and deeply into the socket as shown in Fig. 6-2.
To purchase spare illumination lamp, contact Nikon dealer or distributor.

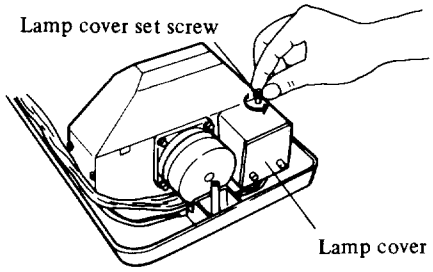


Fig. 6-1

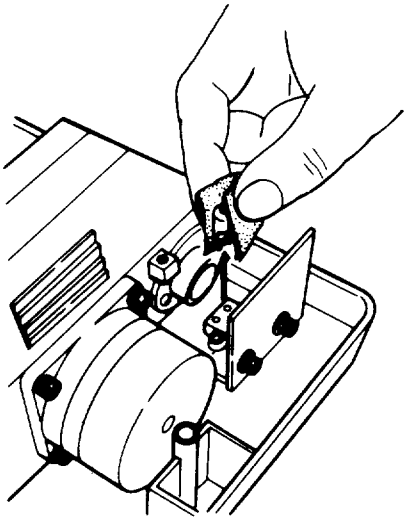


Fig. 6-2

(2) Precautions for illumination lamp replacement

1 Let the lamp cool before replacing it. Do not touch other parts of the equipment.

2 Do not hold the new lamp with your bare fingers. Fingerprints may cause the lamp to break while power is turned ON. Wipe off any dirt with alcohol. Do not wipe the lamp while it is ON or hot.

3 For attachment or removal of the lamp cover, carefully lift it up straight with both hands to prevent the lamp from being broken by touching the cover.

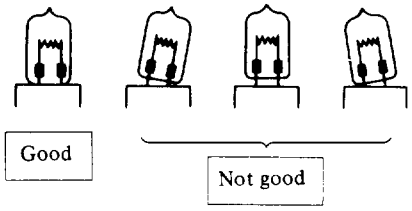


Fig. 6-3

6-2. Fuse Replacement

The fuse may be blown if the pilot lamp and illumination lamp do not go ON when the main switch is turned ON. Before starting replacement, be sure to turn OFF the main switch and disconnect the power cord from the wall outlet.

To replace the fuse, first use a single-blade screwdriver or the like and release the click-locks on the sides of the fuse box in the rear of the main body, as shown in Fig. 6-4. Then remove the box together with the fuse. After replacement with a new fuse, match the notch direction and push in the fuse box firmly till it clicks. Use two fuses of 1 A/250 V (short).

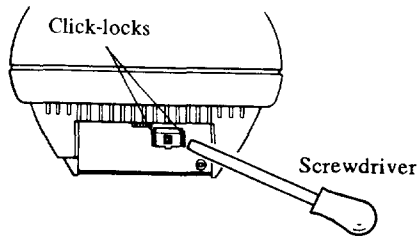


Fig. 6-4

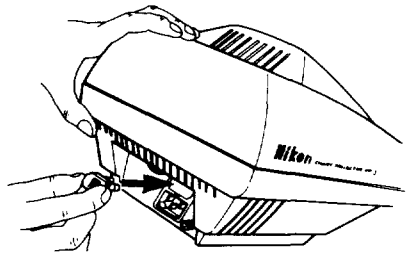


Fig. 6-5

6-3. Remote Controller Battery Replacement

Perform steps 1 through 3 as follows.

- The dry cell may need replacing if the chart does not move or if it moves slowly when one key of the remote controller was pressed.
  Replace with two AA batteries available in any store. Use of alkaline dry batteries is recommended to ensure long life.

1 Push the stop spring with your fingertip to remove the cell cover in the rear of remote controller, as shown in Fig. 6-6.

2 Insert the cells according to the [+] and [-] marks in the battery chamber of the remote controller.

3 Fit the cover as before.

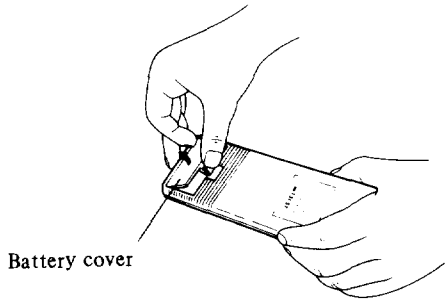


Fig. 6-6

6-4. Setting of Optional Charts (Optional Accessory)

- Optional charts are available for this instrument, in addition to the standard 20 kinds of chart.

1 Press the Coincidence chart key so that the Coincidence test chart is in the projection optical pathway. Then, perform the following steps 2 through 3 for setting.

2 Turn OFF the main switch. Then, remove the upper cover and lift the dust-proof cover straight up to remove as shown in Fig. 6-7.

3 Fit the optional chart to the optional chart mounting plate as shown in Fig. 6-8. 1 ~ 4 keys of the remote controller correspond to the 1 ~ 4 windows of the optional chart mounting plate as Fig. 6-9.

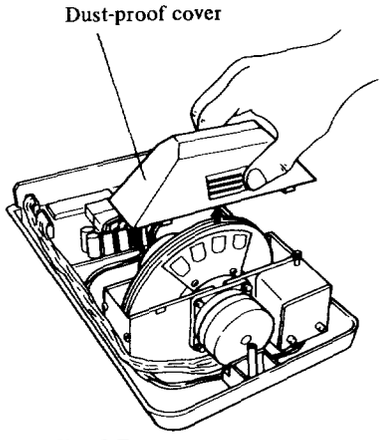


Fig. 6-7

*Do not turn the glass plate by hand, or the chart setting position may be displaced.

*The sticker for remote controller is provided with the optional chart. Stick it to corresponding chart key of the remote controller.

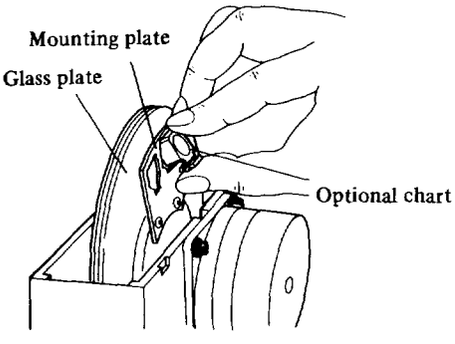


Fig. 6-8

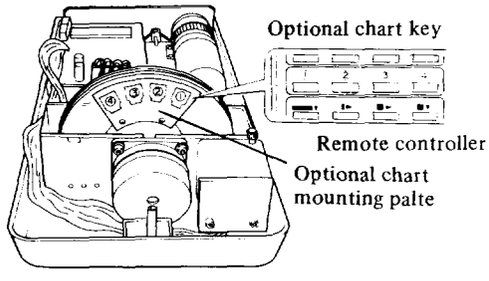


Fig. 6-9

6-5. Attachment of the Remote Controller with Wire

- The remote controller with wire is available as optional accessory. To attach it, connect the leading end of the remote controller wire to the remote control terminal at the rear of the main body as shown in Fig. 6-10.

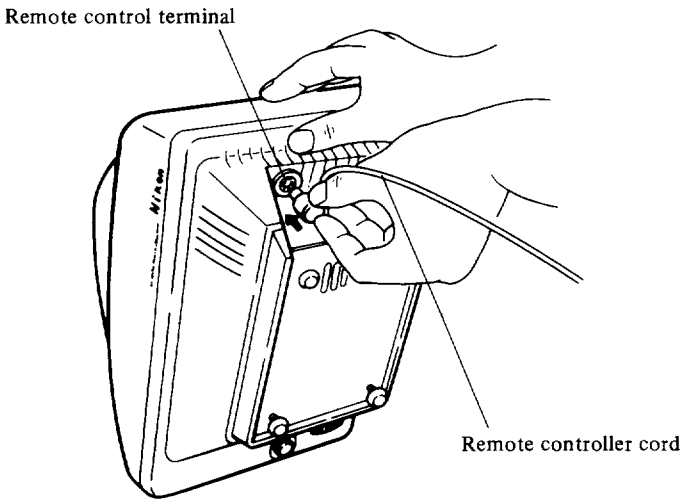


Fig. 6-10

6-6. Setting for Use of Multiple Projectors

Up to four remote controllers can be used in one room without mutual interference as shown in Fig. 6-11.

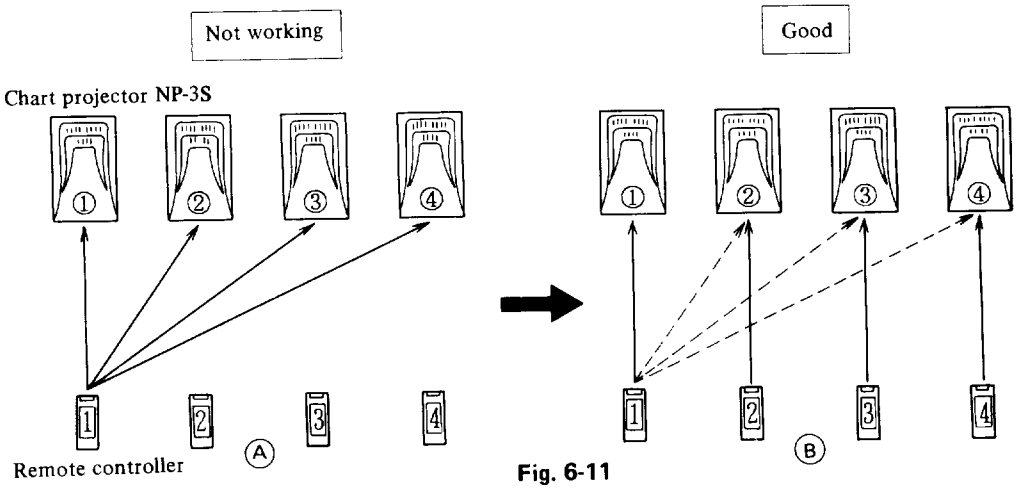
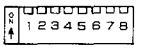
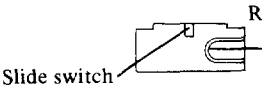
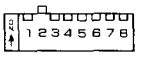
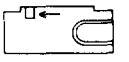
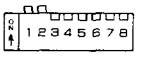
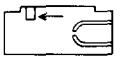
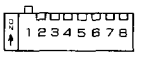
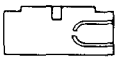


Fig. 6-11

One remote controller is activating 1 through 4 projectors.

With the dip switch and remote control setting, the remote controller 1 activates the projector 1 only. The same applies to projectors 2 through 4.

To achieve the state as shown in (B) of Fig. 6-11, each chart projector and remote controller must be set correspondingly. For setting, see the Table below. Be sure to turn OFF power supply and do not touch the unneccessary dip switches.

Operation	Remove the upper cover of the chart projector and operate the dip switches on the printed circuit board.	Remove the battery cover of the remote controller shown in Fig. 6-12. A rectangular space is visible over the battery case. Use the slide switch and jumper line in this space.
1 Standard	 Dip switch No. 1 and 2 DOWN	
2	 No. 1 DOWN and No. 2 UP	
3	 No. 1 and 2 UP	 Cut the jumper line
4	 No. 1 UP and No. 2 DOWN	 Cut the jumper line

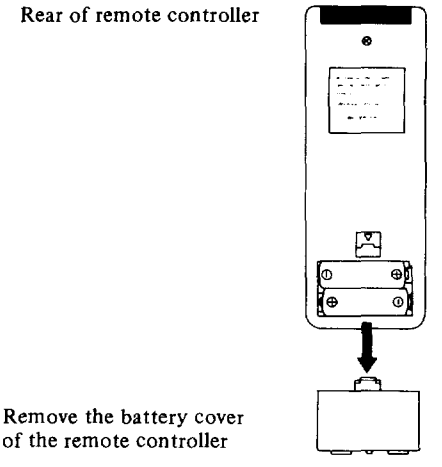


Fig. 6-12

7. List of Charts

There are 24 kinds of chart mounts for this instrument as shown in Fig. 7-1. Of these charts, 20 are for standard and 4 are optional.

Also available are three charts: numbers chart (1.0 number model), Snellen chart (1.0 letters model), and Snellen number chart (20/20 letters model).

[Example: European multiple chart (1.0 letters model)]

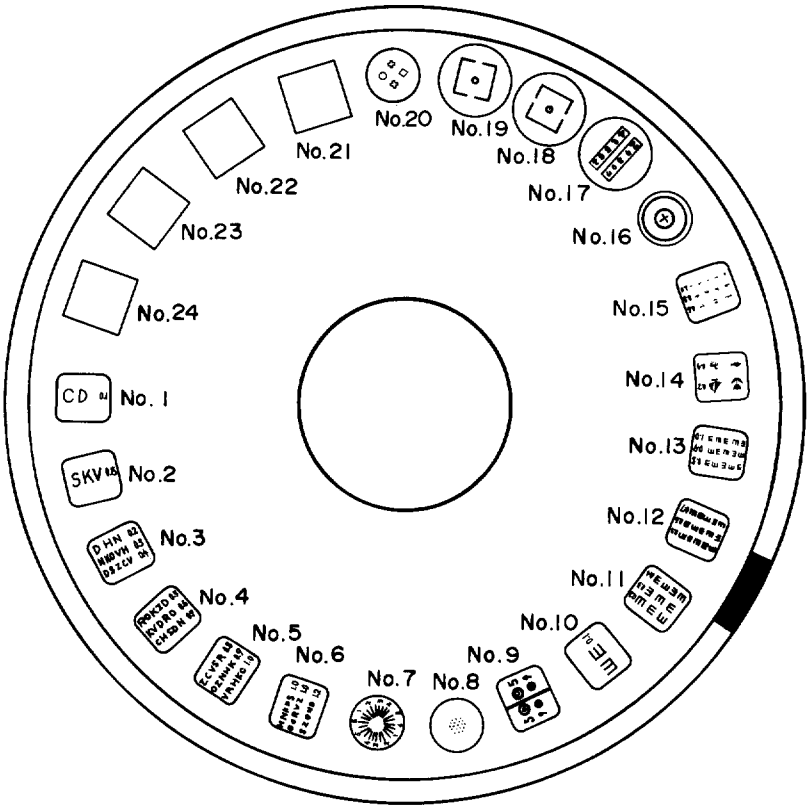


Fig. 7-1

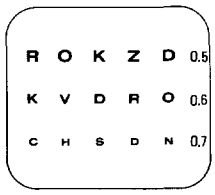
Kinds of charts

1. European Multiple Chart Nos. 1 to 20 (1.0 letters model)

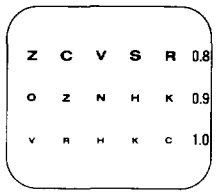
No. 1
Letter chart
(0.1)

No. 2
Letter chart
(0.15)

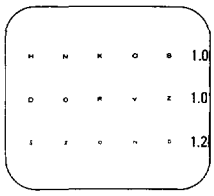
No. 3
Letter chart
(0.2 to 0.4)



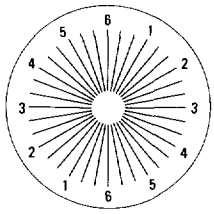
No. 4
Letter chart
(0.5 to 0.7)



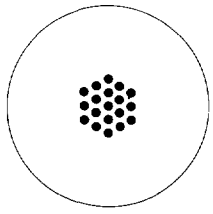
No. 5
Letter chart
(0.8 to 1.0)



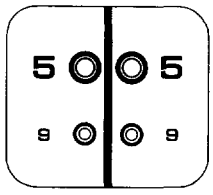
No. 6
Letter chart
(1.0 to 1.2)



No. 7
Astigmatic dial chart
(10° steps)

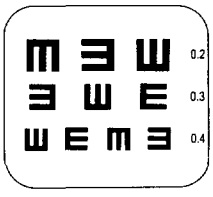


No. 8
Cross cylinder
dots chart

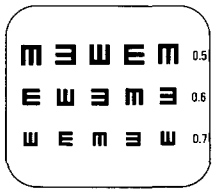


No. 9
Red and green
chart

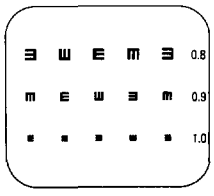
No. 10
Letter E chart
(0.1)



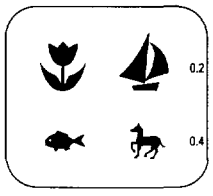
No. 11
Letter E chart
(0.2 to 0.4)



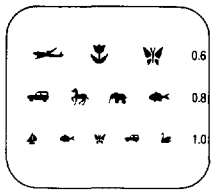
No. 12
Letter E chart
(0.5 to 0.7)



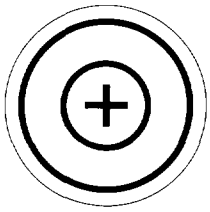
No. 13
Letter E chart
(0.8 to 1.0)



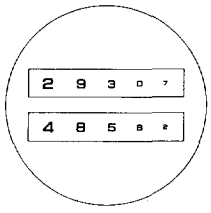
No. 14
Children's
chart (0.2 / 0.4)



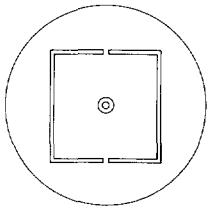
No. 15
Children's chart
(0.6 to 1.0)



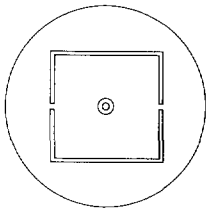
No. 16
Schober test
chart



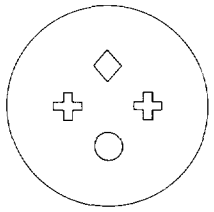
No. 17
Binocular
balance chart



No. 18
Coincidence
test chart



No. 19
Coincidence
test chart

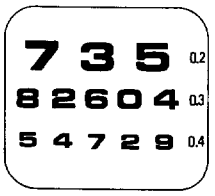


No. 20
Worth's four-dot
test chart

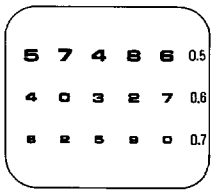
2. Numbers chart Nos. 1 to 20 (1.0 numbers model)

No. 1
Numbers chart
(0.1)

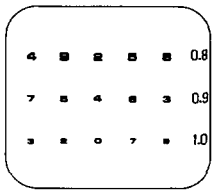
No. 2
Numbers chart
(0.15)



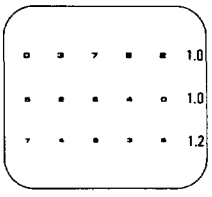
No. 3
Numbers chart
(0.2 to 0.4)



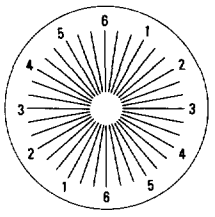
No. 4
Numbers chart
(0.5 to 0.7)



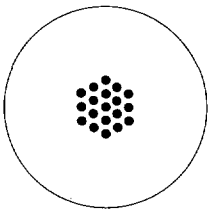
No. 5
Numbers chart
(0.8 to 1.0)



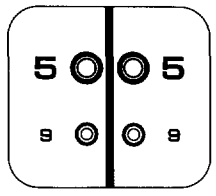
No. 6
Numbers chart
(1.0 to 1.2)



No. 7
Astigmatic dial chart
(10° steps)

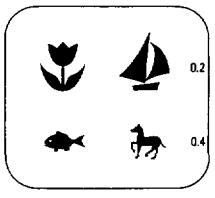


No. 8
Cross cylinder
dots chart

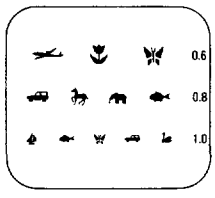


No. 9
Red and green
chart

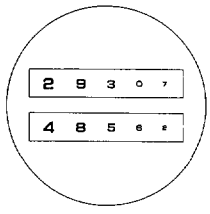
No. 10
Children's chart
(0.1)



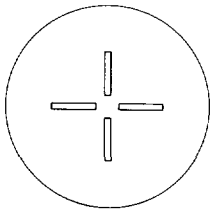
No. 11
Children's chart
(0.2 / 0.4)



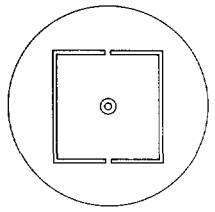
No. 12
Children's chart
(0.6 to 1.0)



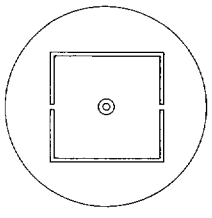
No. 13
Binocular
balance chart



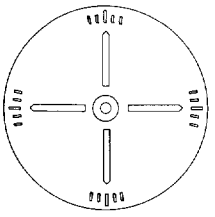
No. 14
Muscle
balance chart



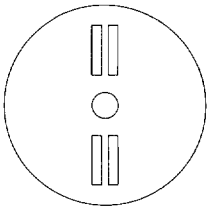
No. 15
Coincidence test
chart



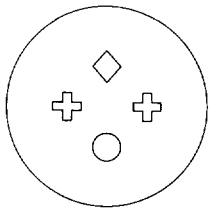
No. 16
Coincidence
test chart



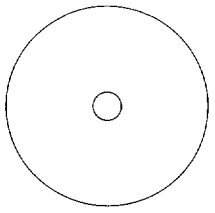
No. 17
Cyclotropia
test chart



No. 18
Stereo scopic
vision test chart



No. 19
Worth's four
dot test chart



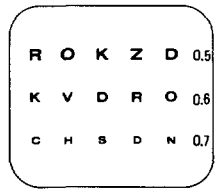
No. 20
Fixation spot chart

3. Snellen chart Nos. 1 to 20 (1.0 letters model)

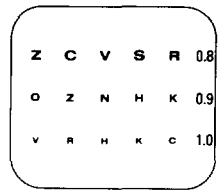
No. 1
Letter chart
(0.1)

No. 2
Letter chart
(0.15)

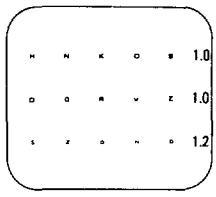
No. 3
Letter chart
(0.2 to 0.4)



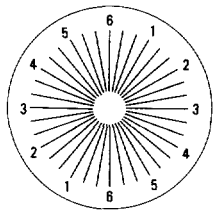
No. 4
Letter chart
(0.5 to 0.7)



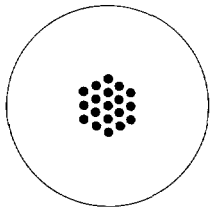
No. 5
Letter chart
(0.8 to 1.0)



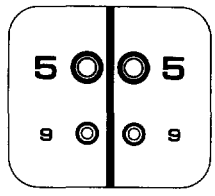
No. 6
Letter chart
(1.0 to 1.2)



No. 7
Astigmatic dial chart
(10° steps)

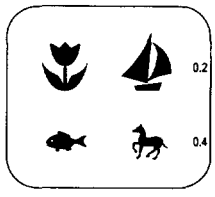


No. 8
Cross cylinder
dots chart

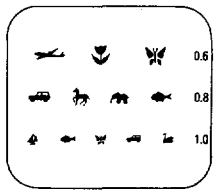


No. 9
Red and green
chart

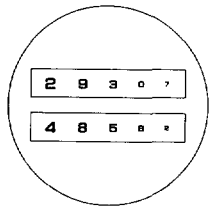
No. 10
Children's chart
(0.1)



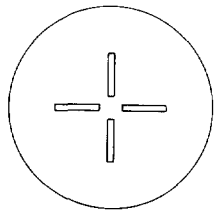
No. 11
Children's chart
(0.2 / 0.4)



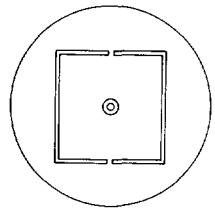
No. 12
Children's chart
(0.6 to 1.0)



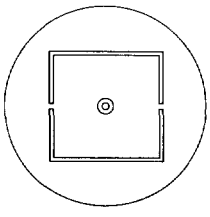
No. 13
Binocular
balance chart



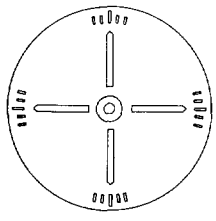
No. 14
Muscle
balance chart



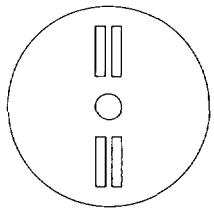
No. 15
Coincidence test
chart



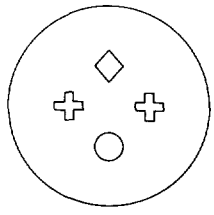
No. 16
Coincidence
test chart



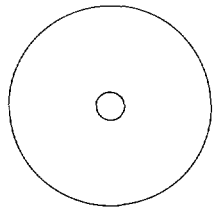
No. 17
Cyclotropia
test chart



No. 18
Stereo scopic
vision test chart

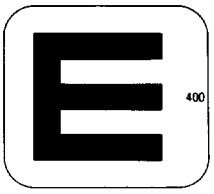


No. 19
Worth's four
dot test chart

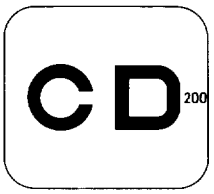


No. 20
Fixation spot chart

4. Snellen Numbers chart Nos. 1 to 20 (20/20 letters model)

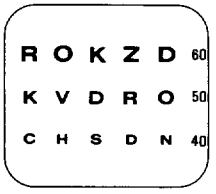


No. 1
Letter chart
(400)

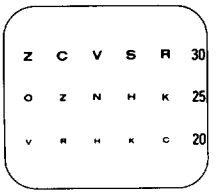


No. 2
Letter chart
(200)

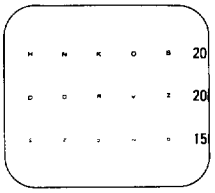
No. 3
Letter chart
(100 to 70)



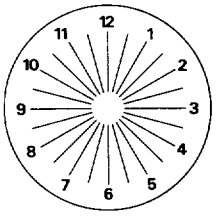
No. 4
Letter chart
(60 to 40)



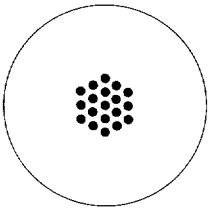
No. 5
Letter chart
(30 to 20)



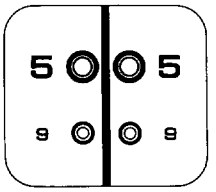
No. 6
Letter chart
(20 to 15)



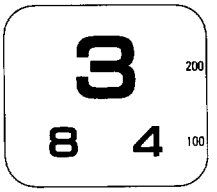
No. 7
Astigmatic dial
chart (15° steps)



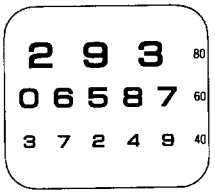
No. 8
Cross cylinder
dots chart



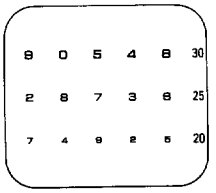
No. 9
Red and green
chart



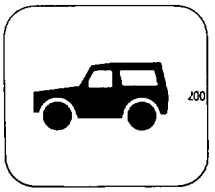
No. 10
Numbers chart
(200/100)



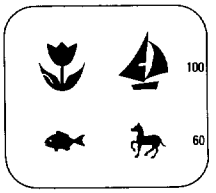
No. 11
Numbers chart
(80 to 40)



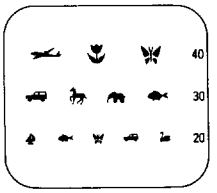
No. 12
Numbers chart
(30 to 20)



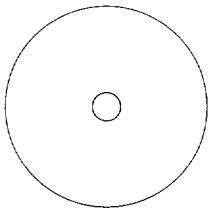
No. 13
Children's chart
(200)



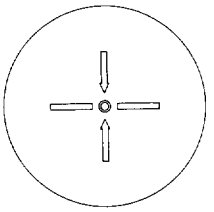
No. 14
Children's chart
(100/60)



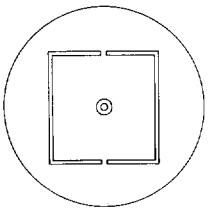
No. 15
Children's chart
(40 to 20)



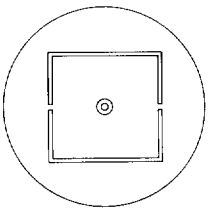
No. 16
Fixation spot
chart



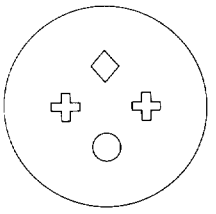
No. 17
Muscle
balance chart



No. 18
Coincidence
test chart



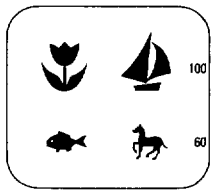
No. 19
Coincidence
test chart



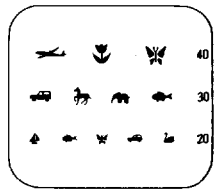
No. 20
Worth's four-dot
test chart

• Snellen Numbers chart Nos. 13 to 20 (20/20 letters model)

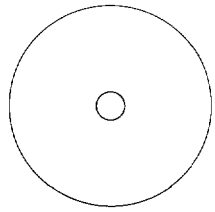
No. 13
Children's chart
(200)



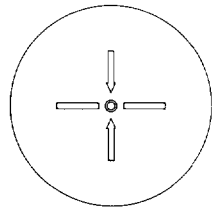
No. 14
Children's chart
(100/60)



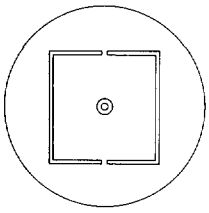
No. 15
Children's chart
(40 to 20)



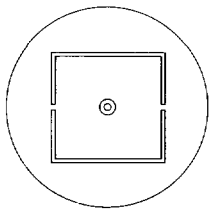
No. 16
Fixation spot
chart



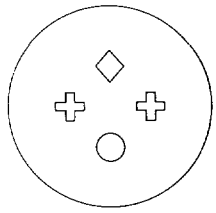
No. 17
Muscle
balance chart



No. 18
Coincidence
test chart



No. 19
Coincidence
test chart



No. 20
Worth's four-dot
test chart

8. Main Specifications

- Magnification — 29.3x at 20ft
  For variable focus model
  24x at 5m
  For non-variable focus model
- Projection distance — 9.5 ~ 23.3x
  For variable focus model
  2.9m to 6.1m (10ft to 20ft)
  For non-variable focus model
- Projection field — 293 x 263.7mm
  ϕ293mm (Astigmatism test chart/Cross cylinder test chart)
  For variable focus model
  240mm x 216mm
  ϕ240mm (Astigmatism test chart/Cross cylinder test chart)
  For non-variable focus model
- Tilting adjustment — Adjustable within ±12°
- Test charts — Standard 20 sets + optional 4 sets

Chart contents (standard set) (See page 22-27)

	European multiple chart	Numbers charts	Snellen chart	Snellen numbers chart
• Letters chart (visual acuity 400 to 15) ..... 6 kinds				6
• Letters chart (visual acuity 0.1 to 1.2) ..... 6 kinds	6		6	
• Letter E chart (visual acuity 0.1 to 1.0) ..... 4 kinds	4			
• Numbers chart (visual acuity 200 to 20)..... 3 kinds				3
• Numbers chart (visual acuity 0.1 to 1.2)..... 6 kinds		6		
• Astigmatic dial chart (10° steps)	1	1	1	
• Astigmatic dial chart (15° steps)				1
• Cross-cylinder dots chart	1	1	1	1
• Red/green chart	1	1	1	1
• Muscle balance chart ..... 2 kinds		1	1	1
• Coincidence test chart ..... 2 kinds	2	2	2	2
• Cyclotropia test chart		1	1	
• Stereoscopic vision test chart		1	1	
• Worth's four-dot test chart	1	1	1	1
• Fixation spot chart		1	1	1
• Children's chart (visual acuity 0.1 to 1.0) ... 3 kinds	2	3	3	
• Children's chart (visual acuity 200 to 20) ... 3 kinds				3
• Schober test chart	1			
• Binocular balance chart	1	1	1	
	(20)	(20)	(20)	(20)

9-1. Standard Set

- Main body (with built-in illumination lamp) 1
- Remote controller (with AA batteries x 2 pcs) 1
- Power cord 1
- Spare fuse 1
- Fixation bolts 2
- Vinyl bag 1
- Test scale chart 1
- Instructions 1
- Screen (with string and hook · for countries other than U.S.A. only) 1

9-2. Optional accessories

- Screen (with string and hook · for U.S.A. only)
- Screen frame
- Optional chart
- Wall-mount bracket
- Floor stand
- Remote controller with wire
- Illumination lamp (6V,20W halogen lamp)